Newsletter on Computational and Applied Mathematics

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Aims and scope:
The CAM-newsletter is a newsletter intended for numerical analysts and applied mathematicians. Topics included are book reviews, announcements and reports of conferences outside the U.S.A., titles of institutional reports and available numerical software.
The contact persons will collect and pass the announcements of events taking place in their country. Institutions interested to insert in the newsletter the titles of their recent reports are kindly invited to send such information to the editors. Authors who are willing to distribute their numerical software for research purposes may use the column "available software". They should send a note to the editors containing a brief description of their programs and practical information for a potential user. Also bibliographies on special purpose software may be published in this column.

Contributions to the next issue should be sent to the editors before January 10, 1996.

1 Book reviews

SVD and Signal Processing III
M. Moonen and B. De Moor (eds.)
Elsevier, Amsterdam, 1995, 11 + 485 pages,
ISBN 0 444 82107 4, Hardbound,
Price: Dfl. 325, US $ 191.25

These are the proceedings of the third international workshop on Singular Value Decomposition and signal processing held in Leuven, Belgium, August 22-25, 1994. Of historical interest is the opening paper, which is an English translation of the 1873 paper by Beltrami, where singular values were introduced for the first time. After 120 years, singular values have gained an anchor position in numerical linear algebra. Numerous computational problems and applications rely on singular values as these proceedings testify once more. The book contains 4 keynote papers of about 20 pages each plus 45 contributed papers of approximately 10 pages. The keynote papers treat the computation of large scale SVD problems (D. Sorensen); matrix flows with eigenvalue preserving properties which solve matrix differential equations inspired by analog and neural computing (U. Helmke); a nonlinear generalization of SVD which stems from the solution of structured and weighted total least squares problems (B. De Moor); and a framework for discussing quantization effects of digital signals (N. Thao and M. Vitterli). The remaining papers are organized in three groups: algorithms and theoretical aspects (15 papers); architectures and real time implementation (9 papers); and applications (21 papers). The first group covers a wide variety of mostly algorithmic aspects like the QD algorithm, rank revealing algorithms, Arnoldi iteration, downdating ULV decomposition, QSVD computation etc. In the second group one finds systolic arrays, parallel computing and several tracking problems. Most of the application papers are covered by the areas of estimation, identification, signal and image processing. These proceedings are an excellent source for researchers and students, giving an overview of current research involving singular values and a selection of their applications.

A. Bultheel

Fractal Image Compression, Theory and Application
Y. Fisher (ed.)
Springer-Verlag, New York, 1995, 18 + 341 pages,
ISBN 3 540 94211 4, Hardcover, Price: DM 78

The book gives an up to date state of the art in fractal image compression. In two introductory chapters, the editor describes the problem and suggests solutions and gives the mathematical background of fractals and iterated function systems (IFS). The idea is to represent an image as a fractal, the fixed point of such an IFS. The success of the method depends on the self similarity of the image. Since a general image is never a perfect fractal, the encoded image will never be a perfect representation of the original. The encoding consists in decomposing the image in regions (domains) which are compared with another set of regions (ranges) in search for an optimal self similarity. In principle every domain has to be compared with every range, each time computing an optimal (usually affine) transformation, mapping the domain onto the range. In this way an optimal mapping of the image onto itself is found (the IFS) which represents the encoded image. This naive approach is very time consuming and the research represented is aiming at optimizing this process. One possibility is to optimize the construction of the regions. There are 3 basic adaptive techniques: quadtree (a region is adaptively subdivided in 4 quadrants), horizontal-vertical (HV) (a region is divided in two by horizontal or vertical lines) or by triangularization. A procedure in C-code in included in appendix for encoding and decoding using the quadtree approach. Several other authors contributed in several chapters different approaches for the efficient implementation of the basic idea. One way is to use achetypes, which are typical image regions for a class of images, so that encoding can be more efficient and faster. Another way is to exploit self similarity at different resolutions, thus introducing a hierarchical structure. A group from NTH Trondheim presents a linear algebra framework for digital images. The process can be described in a matrix notation and the whole strength of linear algebra (orthogonalization, eigenvalues, ...) can be applied: regions can be described as orthogonal blocks, these

blocks can be classified into clusters etc. Other contributions go beyond the affine mappings or use the framework of weighted finite automata to describe the IFS. The book closes with a small number of exercises about the basic material and an extensive set of open problems and research projects.
This book will probably be the reference work on the subject for researchers in this area for years to come.

A. Bultheel

Numerical Integration on Advanced Computer Systems

A.R. Krommer and C.W. Ueberhuber
Lecture Notes in Computer Science, Volume 848, Springer-Verlag, Berlin, Heidelberg 1994,
ISBN 3-540-58410-2, xiii + 341 pages, DM 72 ; £31.50 / FF 272

This book consists of three parts. The first introductory part, starts with describing several areas of scientific computing in which numerical integration plays an important role and then continues with exploiting the fundamentals of numerical integration.
The second part describes the mathematical concepts underlying numerical integration. First a chapter is devoted to the various types of integrals (Riemann integrals, improper integrals, Cauchy principal value integrals, hypersingular integrals) as well as to the standard integration regions and weight functions. Then two chapters are devoted to integration rules, one on univariate integration rules (quadrature formulas) and another on multivariate integration rules (cubature formulas). The long chapter on cubature formulas gives a more or less up-to-date overview of this domain, better anyhow than the other books available. My major objection is that not always the primary reference is given. This part contains interesting material both for graduate students and researchers.
The third part of the book deals with algorithmic and computational aspects of numerical integration. One chapter is devoted to well known aspects, such as adaptive versus non-adaptive algorithms, error estimation, and problems of reliability and efficiency. The remaining chapters are devoted to aspects of parallel and distributed computing. The potential parallelism is analysed in detail and different parallelisation schemes for integration algorithms are investigated. I really find it a pity that the description in the text stops when it becomes very interesting and the references given at such stops are to internal reports. For graduate students this may be enough but for researchers it is not.
The last part is devoted to software aspects. In a first chapter different criteria and techniques for the assessment of numerical integration software are presented. The last and final chapter is on architecture adaptive integration algorithms. Again, the interested reader is pointed to an internal report for the details, which – from what is mentioned in the book – seems interesting.

R. Cools

An Exploration of Chaos

J. Argyris, G. Faust and M. Haase
Mathematical Methods in Physics, Fluid Mechanics, Foundations and Basic Methods, Mathematical Methods, North-Holland, Amsterdam, 1994, 772 pages, ISBN 0-444-82002-7, Hardbound, Price: Dfl. 445, US $ 254.25,
ISBN 0-444-82003-5, Paperback, Price: Dfl. 175, US $ 100

This textbook gives an elementary but very detailed introduction to the theory of nonlinear dynamical systems with emphasis on chaotic phenomena. The first chapters (65 pages) cover the basic theory of dynamical systems. Chapter 4 (40 pages) deals with conservative systems, including an outline of the KAM theory. Chapter 5 (120 pages) deals with dissipative systems, including a detailed discussion of power spectra, Lyapunov exponents, the various definitions of dimension of attractors (fractal dimension, Lyapunov dimension, etc.), and a discussion of Kolmogorov-Sinai entropy. Chapter 6 (138 pages) presents local bifurcation theory. In chapter 7 (25 pages) the Bénard problem in convection flows is discussed in great detail. Chapter 8 (120 pages) discusses the various routes to turbulence. In the last chapter 9 (150 pages) various computer experiments are described: exploration of the classical Hénon map, Lorenz system and Van der Pol equation,

... but also oscillatory kinetics of chemical reactions and chaotic behaviour in the solar system. The book is written primarly for physicists and engineers. Therefore besides the mathematical theory, also a broad range of physical problems is discussed in detail. But in this way, the book is also very interesting for mathematicians, because it clearly shows both the origin and the application of the theory of dynamical systems.
This book contains a wealth of information, is very clearly written and contains many illustrations, figures, color pictures both of experiments and computer simulations. Although there exist many other good books on nonlinear dynamical systems, the broad range of topics covered and the outstanding illustrations make this book very interesting and valuable.

D. Roose

2 Conferences

THIRD WORKSHOP ON GLOBAL OPTIMIZATION

Date: 10–14 December, 1995.

Location: Szeged, Hungary.

Other Information: CAM-Newsletter 11, nr. 2.

Contact address:
Tibor Csendes
Jozsef Attila Un., Institute of Informatics
H-6701 Szeged, P.O. Box 652, Hungary
Tel.: +36 62 310 011 (ext. 3839)
Fax: +36 62 312 292
email: globopt@inf.u-szeged.hu

WINTER SCHOOL ON ITERATIVE METHODS

Date: 14–20 December, 1995.

Location: The Chinese Un. of Hong Kong.

Other Information: CAM-Newsletter 11, nr. 2.

Contact address:
Dr. K.M. Yeung, Department of Mathematics
Chinese University of Hong Kong
Shatin, Hong Kong
Fax: +(852) 2603-5154
email: kmyeung@cuhk.hk

12TH GAMM-SEMINAR KIEL ON BOUNDARY ELEMENTS: IMPLEMENTATION AND ANALYSIS OF ADVANCED ALGORITHMS

Date: 19–21 January, 1996.

Location: Kiel, Germany.

Organizers: W. Hackbusch (Kiel), G. Wittum (Stuttgart).

Sponsors:
The GAMM Committee "Efficient numerical methods for pde", the Christian-Albrechts-Universität Kiel.

Topics:
Implementation and Application of: Wavelets to Boundary Integral Equations, Matrix Compression Techniques, Multipole and Panel-Clustering, Cubature Techniques for Singular and Nearly Singular Surface Integrals, Parallelization Techniques for BEM, Fast Solvers and Software Design Aspects for BEM.

Other information:
- Contributers should send an abstract (10-20 lines) of their lecture by November 15, 1995. Notice of acceptance will be given by November 30. All participants, whether giving a talk or not, have the possibility of sending an abstract of their work on the topic of the conference. The collection of abstracts will be available at the conference
- The Conference fee is DM 50, to be paid after arrival.
- The first eleven GAMM-Seminars were held at Kiel in 1984, 1986-1994. The corresponding proceedings have been published in the series "Notes on Numerical Fluid Mechanics" by Vieweg Verlag, Braunschweig, Germany. (Volumes 10, 16, 21, 23, 30, 31, 33, 41, 46 and 49).

Contact address:
J. Burmeister, GAMM Seminar 1996
Lehrstuhl Praktische Mathematik der
Christian–Albrechts–Universitat Kiel
Olshausenstr, 40–60
D–24098 Kiel, Germany
Tel. : ++49-431-880-4462
Fax : ++49-431-880-4054
email: jb@informatik.uni-kiel.d400.de

CONFERENCE ON STATE OF THE ART IN NUMERICAL ANALYSIS

Date: 1–4 April, 1996.

Location: University of York, U.K.

Invited speakers:

K.E. Atkinson (Un. of Iowa, USA), C.T.H. Baker (Un. of Manchester, UK), F. Brezzi (Un. di Pavia, Italy), D.S. Broomhead (RSRE, Malvern, UK), I.S. Duff (Rutherford Appleton Lab., UK), C.M. Elliott (Un. of Sussex, UK), G.H. Golub (Stanford Un., USA), N.I.M. Gould (Rutherford Appleton Lab., UK), N.J. Higham (Un. of Manchester, UK), A. Iserles (Un. of Cambridge, UK), J.M. Morel (Un. Paris IX Dauphine, France), K.W. Morton (Un. of Oxford, UK), F. Natterer (Inst. fur Num. & Instr. Math., Munster, Germany), J. Nocedal (Northwestern Un., USA), M.J.D. Powell (Un. of Cambridge, UK), J.M. Sanz-Serna (Un. de Valladolid, Spain), D.F. Shanno (Rutgers Un., USA), A.M. Stuart (Stanford Un., USA), E. Suli (Un. of Oxford, UK), H. van der Vorst (Rijksvu. Utrecht, The Netherlands) and G.A. Watson (Un. of Dundee, UK).

Other information: CAM-Newsletter 11, nr. 2.

Contact address:

Mrs. Pamela Bye, Conference Officer
The Inst. of Mathematics and its Applications
Catherine Richards House
16 Nelson Street
Southend-on-Sea
Essex, SS1 1EF
Tel: (01702) 354020
Fax: (01702) 354111
email: IMACRH@V-E.ANGLIA.AC.UK

2ND CONFERENCE ON REAL NUMBERS AND COMPUTERS

Efficient handling of real numbers in a computer is not yet solved in a satisfying way. The "floating point" formats most often used in scientific computing usually give sufficient results, but some reliability problems may occur. Program portability problems could imply some rewriting costs: some programs which work well with one machine, could become unreliable with another one. Users (working on computer algebra, algorithmic geometry) may need far more accurate results (even "exact results") than the ones obtained with usual number systems. Many members of the scientific community are concerned by this problem; they could share their knowledge and come up with solutions. But often they do not have the opportunity to meet, they do not belong to the same scientific fields (computer science, number theory, numerical analysis, computer algebra) and they have a different vocabulary. The aim of this conference is to put them together in order to establish some collaboration.

Date: 9–11 April, 1996.

Location: Marseille, France.

Topics:

- Algorithms and architectures for "serial" and "on line" arithmetic.
- Relations between number theory, automata theory and computer arithmetic.
- Number systems.
- Floating point arithmetic.
- Calculability.
- Symbolic manipulation of numbers.
- Algorithms for "exact" computing.
- Multi-precision, interval arithmetic.
- Accuracy problems in various fields and proposed solutions.

Other information:

- The first "real numbers and computers" conference was held in April 1995 at St-Etienne.
- Potential contributers must send 4 copies of a printed version of their full paper to the address given below.

Conference language: English, French.

Contact address:

Jean-Claude Bajard
Laboratoire de l'Informatique de Marseille
Centre de Mathématiques et d'Informatique
Université de Provence
39 rue Joliot-Curie
13453 Marseille Cedex 13, France

BETECH 96
BOUNDARY ELEMENT TECHNOLOGY

Date: 24–26 April, 1996.

Location: Hawaii, USA .

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
Liz Kerr, Wessex Inst. of Technology
Ashurst Lodge, Ashurst
Southampton SO40 7AA, UK

PARALLEL CFD'96

Date: 20–23 May, 1996.

Location: Capri, Italy.

Organizer: C.I.R.A.

Objective:
To discuss recent developments and applications of Parallel Computing in CFD.

Topics:
Novel parallel algorithms, parallel Euler and Navier Stokes solvers, parallel multigrid techniques, parallel implicit schemes, parallel unstructured solvers, parallel flow visualization and grid generation.
Applications of interest include (but are not limited to): reacting flows, rarefied gas flows, multiphase flows, turbulence, hypersonic reentry problems, aerodynamic flows, climate modelling, parallel computing in aeronautics, astronautics, mechanical engineering, vehicle design and environmental engineering.

Other information:
Conference participants are invited to submit an extended abstract of at least 1000 words and no more than 2000 words, not later than december 31, 1995. Notification of acceptance will be forwarded around February 15, 1996. The extended abstract should satisfy the following specifications:

- Name of the authors and their affiliations
- the type of problem as described in the list of subject areas
- the importance and difficulty of the problem considered
- a clear description of the physical problem model
- inclusion of any results already obtained
- a conclusion indicating the foreseen results to be presented at the conference.

Participants may register for the conference before April 30 at a cost of $500. Conference registrations include: Proceedings, lunches, banquet and coffee breaks. Registrations after April 30 may be obtained at a cost of $550.

Contact address:
Pasquale Schiano, CIRA
via Maiorise, 81043 Capua (CE), Italy
Tel.: +39 823 623140
Fax: +39 823 623126
email:parcfd96@cira.it

THIRD INTERNATIONAL CONFERENCE
ELECTROSOFT 96
SOFTWARE FOR ELECTRICAL ENGINEERING ANALYSIS AND DESIGN

Date: 28–30 May, 1996.

Location: San Miniato, Italy.

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
Paula Doughty-Young, Conference Secretariat
Wessex Inst. of Technology, Ashurst Lodge
Ashurst, Southampton, SO40 7AA, UK
Tel: 44 (0) 1703 293223
Fax: 44 (0) 1703 292853
email: CMI@ib.rl.ac.uk

FOURTH INTERNATIONAL CONFERENCE
LOCALISED DAMAGE 96
COMPUTER AIDED ASSESSMENT AND CONTROL

Date: 3–5 June, 1996.

Location: Fukuoka, Japan.

Other information: CAM-Newsletter 11, nr. 2.

Contact Address:
Jane Evans, Conference Secr. LD96
Wessex Inst. of Technology, Ashurst Lodge
Ashurst, Southampton SO40 7AA, UK
Tel: 44 (0) 703 293223
Fax: 44 (0) 703 292853
email: CMI@ib.rl.ac.uk

9TH INTERNATIONAL CONFERENCE ON DOMAIN DECOMPOSITION METHODS

Domain Decomposition (DD) has received significant attention in scientific and engineering computing because it is not only a computing strategy suitable to high performance computing systems, but also refers to a broad class of effective numerical methods for solving large scale mathematical-physical problems from sciences and engineering.

Date: 3–8 June, 1996.

Location: Hardanger Fjord, Bergen, Norway.

Organizer: The University of Bergen.

Topics:
All aspects of DD-methods, including numerical analysis of DD methods, block and substructuring methods, multigrid and multilevel methods, fictitious domain methods, DD methods for high order and spectral methods, DD methods for nonlinear and time dependent problems, DD methods in computational fluid dynamics and structural mechanics, graph decomposition, general iterative and preconditioning methods, strategies and technologies of high performance computing, parallel implementations, software developments, and industrial applications.

Other information:
The conference will feature invited lectures, selected contributed papers, and poster presentations. Prospective contributers should submit a 1 page abstract before January 26, 1996.

Contact address:
Mrs Synnøve S. Palmstrøm
DDM9 Conference secretary
Department of Informatics/Parallab
Hxyteknologisenteret
N-5020 Bergen, Norway
Tel.: +47 55 54 41 70
Fax.: +47 55 54 41 99
email: dd9@ii.uib.no

RECENT ADVANCES IN PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS

Date: 10–14 June, 1996.

Location: Venice, Italy.

Organizers:
R. Spigler (Lecce), A. Leaci (Lecce), M. Pitteri (Padova), F. Sartoretto (Venice), S. Venakides (Duke), C.D. Pagani (Milan).

Invited Speakers:
D. McLaughlin (Courant-NYU), C. Cercignani (Politecnico Milan), A.J. Chorin (Berkeley), G. Da Prato (SNS Pisa), E. De Giorgi (SNS Pisa), P.A. Deift (Courant-NYU), G. Gallavotti (Rome), S. Klainerman (Princeton), C.D. Levermore (Arizona and IAS), P.L. Lions (Paris IX), A.J. Majda (Courant-NYU and Princeton), U. Mosco (Rome), G.C. Papanicolaou (Stanford), J.M. Sanz-Serna (Valladolid), E. Tadmor (Tel Aviv), S. Venakides (Duke).

Other information:
- The conference will be dedicated to Peter D. Lax and to Louis Nirenberg on their 70th birthday.
- The conference fee is 260 US$ (220 US$ if paid before March 31, 1996).
- Contributed papers (20' long) will be accomodated in two Parallel Sessions. Abstracts (1 or 2 pages long) must be submitted before February 28, 1996.

Contact address:
Professor Renato Spigler
c/o Dipartimento di Metodi e Modelli Matematici
Universita di Padova
Via Belzoni, 7
35131 Padova, Italy
Tel.: 0039-49-8275.914; 8275.900, 8275.901
Fax : 0039-49-8275.995
email: spigler at kutta.dmsa.unipd.it

ALGEBRAIC MULTILEVEL ITERATION METHODS WITH APPLICATIONS

Date: 13–15 June, 1996.

Location: Un. of Nijmegen, The Netherlands.

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
Prof. Owe Axelsson, Fac. of Math. & Inform.
Toernooiveld 1, NL-6525 ED Nijmegen
The Netherlands
Fax: 31(0)80652140
email: axelsson@sci.kun.nl

6TH INTERNATIONAL CONFERENCE ON HYPERBOLIC PROBLEMS THEORY, NUMERICS, APPLICATIONS

Date: 15–19 June, 1996.

Location: Hong Kong.

Organizers:
Roderick Wong, Tong Yang, Shing-Tung Yau, Jun Zou.

Sponsors:
The Chinese University of Hong Kong and the City University of Hong Kong.

Objective:
This conference is to provide a high-standard forum for mathematical scientists to present their latest progress on nonlinear hyperbolic problems. It aims at bringing together senior scientists and young researchers for academic interaction.

Other information:
- Titles and abstracts of contributed papers must be received by January 31, 1996. The abstracts should be typed by Latex not to exceed one page, and sent to Dr. Tong Yang by email or floppy disk.
- The registration fee is US$ 120.

Contact address:
Dr. Tong Yang
Department of Mathematics
City University of Hong Kong
83 Tat Chee Avenue
Kowloon, Hong Kong
Tel: (852) 2788-9819
Fax: (852) 2788-8561
email: mago@cityu.edu.hk

4TH INTERNATIONAL CONFERENCE INTEGRAL METHODS IN SCIENCE AND ENGINEERING

Date: 17–20 June, 1996.

Location: Oulu, Finland.

Topics:
Integral equations, Ordinary and partial differential equations, Finite element methods, Conservation laws, Hybrid approaches, Vortex methods, Other integral methods in science and engineering.

Invited Speakers:
D.L. Colton (Un, Delaware, USA), L. Gaul (Un. Stuttgart, Germany), R. Kannan (Un. Texas, USA), A. Klarbring (Linkoping Un., Sweden), N. Morozov (Un. St.Petersburg, Russia), O.A. Ladyzhenskaya (Steklov Math. Inst., Russia), G. Vainikko (Technical Un. Helsinki, Finland), O.C. Zienkiewicz, (Un. College Swansea, UK).

Other information:
Authors of contributed papers are requested to submit, before February 15, 1996, an abstract containing the topic of the talk, a summary (not exceeding 300 words), and the full institutional address including the telephone and fax numbers and e-mail address.

Contact address:
S.Seikkala, IMSE96
Division of Mathematics
Faculty of Technology
University of Oulu
90570 Oulu, Finland
Tel.:358 81 553 2656
Fax: 358 81 553 2664
email: Seppo.Seikkala@ee.oulu.fi

HOUSEHOLDER SYMPOSIUM XIII ON NUMERICAL ALGEBRA

Date: 17-21 June, 1996.

Location: Pontresina, Switzerland.

Topics:
This meeting is the thirteenth in a series, previously called the Gatlinburg Symposia. The name honors Alston S. Householder, one of the pioneers in numerical linear algebra and organizer of the first four meetings. The meeting has traditionally been held in an isolated location and is very informal in style. Each attendee is given the opportunity to present a talk, but a talk is not mandatory. The format of the meeting includes scheduled presentations during the day and more informal evening sessions that are organized onsite. Spirited discussion is encouraged.
We hope that the meeting will be attended by recent entrants into numerical algebra as well as more experienced researchers. We encourage

attendance by core numerical linear algebra researchers, matrix theoreticians, and people in applications such as optimization, signal processing, control, etc.

Plenary speakers:
The plenary speakers and the other participants will be chosen by the international organizing committee on the basis of the abstracts that are submitted.
For full consideration, the committee must receive your abstract by 5 January 1996. Please use the format described in the "abstract" file on the Website and ftpsite. The committee expects to complete the list of attendees and scheduled presentations by 15 February 1996.

Further information:
See the Website http://www.cs.umd.edu/users/oleary. These files are also available via ftp from cs.umd.edu in directory pub/faculty/oleary.

Contact address:
Dr. Martin H. Gutknecht
IPS, RZ F2, ETH-Zentrum
CH-8092 Zurich, Switzerland
email: mhg@ips.id.ethz.ch

MITRINOVIC MEMORIAL CONFERENCE

Date: 20–21 June, 1996.

Location: Belgrade, Serbia-Yugoslavia.

Organizers:
- Serbian Scientific Society, Belgrade
- Faculty of Electrical Engineering, Belgrade
- Faculty of Electronic Engineering, Nis
- Institute of Mathematics SANU, Belgrade.

Topics:
- Approximation Theory
- Complex Analysis
- Differential, Integral and Functional Equations
- General Inequalities
- Orthogonal Polynomials and Special Functions

Other information:
- Two publications are planed to be published in ahead of the conference with survey and shorter contributed papers (up to 8 pages). Due to last Professor Mitrinovic passion – Inequalities, one publication will be entitled as "Progress in Inequalities". The other one will be comprised from the selected papers from other topics. All the submitted papers will be subjected to the referee process.
- Manuscripts should be submitted in two hard copies (up to December 15, 1995) to the address below.

Contact address:
Prof. Gradimir V. Milovanovic
Faculty of Electronic Engineering
P.O. Box 73, 18000 Nis
Serbia, Yugoslavia

FIRST WORKSHOP ON NUMERICAL ANALYSIS AND APPLICATIONS

Date: 24–27 June, 1996.

Location: Russe, Bulgaria.

Organizers:
University of Russe, Association of Bulgarian Mathematicians - Russe.

Topics: The workshop will have three tracks:
1. Numerical linear algebra.
2. Numerical methods for differential equations.
3. Numerical modelling.

Invited Speakers:
R. Bisseling (The Netherlands), L. Brugnano (Italy), S. K. Godunov (Russia), A. Griewank (Germany), A. Hadjidimos (USA), S. Hammarling (UK), W. Hofmann (Germany), A. Karageorghis (Cyprus), Yu. A. Kuznetsov (Russia), R. Maerz (Germany), W. T. Pickering (UK), I. V. Puzynin (Russia), G. I. Shishkin (Russia), T. Szulc (Poland), E. E. Tyrtyshnikov (Russia), W. Varnhorn (Germany), V. V. Voevodin (Russia).

Other information:
We would like to invite all interested individuals to ORGANIZE a MINISYMPOSIUM related to one or more of the conference tracks. Please send a minisymposium abstract (approximately one page) and a list of 4-8 speakers to the address listed below. The deadline for proposals is December 1, 1995.

Contact address:
Plamen Yalamov
Dept. of Mathematics
University of Russe
7017 Russe
Bulgaria
email: yalamov@iscbg.acad.bg

MAFELAP 1996

Date: 25–28 June, 1996.

Location: Brunel Un., Uxbridge, Middlesex, U.K.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:
The Secretary, MAFELAP 1996, BICOM
The Brunel Inst. of Computational Maths
Brunel University, Uxbridge UB8 3PH, U.K.
email: mafelap@brunel.ac.uk

Third International Conference CURVES and SURFACES

Date: 27 June – 3 July, 1996.

Location: Chamonix, Mont Blanc, France.

Organizers:
Alain Le Méhauté, ENST-Bretagne, Brest, France.
Christophe Rabut, INSA, Toulouse, France.
Larry L. Schumaker, Vanderbilt University, Nashvill, U.S.A.

Topics:
Representation of Curves and Surfaces (splines, finite elements, subdivision, ...), Computer Aided Geometric Design, Interpolation and Smoothing, Variational Theory of Splines, Wavelets and Approximation, as well as relevant applications: Image Processing, CAD-CAM, ...

Invited speakers:
Charles K. Chui (Univ. Texas A&M, College Station, U.S.A.), Philippe G. Ciarlet (Univ. P. et M. Curie, Paris, France), Wolfgang Dahmen (RWTH Aachen, Germany), Carl de Boor (Univ. Wisconsin, Madison, U.S.A.), Tim N.T. Goodman (Univ. Dundee, Scotland), Josef Hoschek (TH Darmstad, Germany), Kurt Jetter (Univ. G. Mercator, Duisbourg, Germany), Charles A. Micchelli (IBM, New York, U.S.A.), Alan Pinkus (Technion, Haifa, Israel), Helmut Pottmann (TU Wien, Austria).

Other information:
As for the previous conferences, we expect to publish the invited papers and the accepted research talks, after refereing.

Contact address:
Curves and Surfaces
ENST-Bretagne, BP 832
29285 Brest Cedex, France
Fax: (33) 98 00 10 98
email: chamonix@univ-rennes1.fr

PRAGUE MATHEMATICAL CONFERENCE 1996

Date: 8–12 July, 1996.

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
Prague Mathematical Conference 1996
Math. Inst. of the Academy of Sciences
Zitna 25, CZ-115 67 Praha 1
Czech Republic
Tel: (+42 2) 2421 3973
Fax: (+42 2) 2422 7633
email: pmc96@earn.cvut.cz

NUMERICAL METHODS AND COMPUTATIONAL MECHANICS IN SCIENCE AND ENGINEERING

Date: 15–19 July, 1996.

Location: Miskolc, Hungary.

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
A. GALANTAI, Institute of Mathematics
University of Miskolc
3515 Miskolc-Egyetemvaros, Hungary
Tel: 36-46-365111
Fax: 36-46-365174
email: matnum@gold.uni-miskolc.hu

7TH INTERNATIONAL CONGRESS ON COMPUTATIONAL AND APPLIED MATHEMATICS

Date: 21–26 July, 1996.

Location: Katholieke Univ. Leuven, Belgium.

Organizers:
F. Broeckx, R. Piessens, M. Goovaerts, L. Wuytack.

Topics:
The Congress will concentrate on the analysis of computational techniques for solving real scientific problems. These will be sessions on:

- Parallel algorithms
- Numerical conformal mapping
- Constructive techniques for solving ordinary and partial differential equations
- Computational complex analysis
- Numerical software
- Computational techniques in operations research and statistics
- Mathematical techniques for financial and actuarial sciences.

Invited speakers:
Prof. H. Brunner (Canada), Prof. M.E.H. Ismail (U.S.A.), Prof. F. Marcellan (Spain), Prof. M. Nakao (Japan), Prof. J. Nedoma (Szech Republic), Dr. W. Sweldens (Belgium), Prof. P. Toint (Belgium).

Other information:

- Short Communications (20 minutes duration) will be accepted for presentation. Participants who would like to present a paper should submit a title and a short abstract (at most, 1 page) not later than, March 1, 1996 to the address below.
- Invited and selected papers will be published by Elsevier Science under the North-Holland Imprint.
- The participation fee will be 24.000 BF per person (22.000 BF if payment is made before May 1, 1996.) This includes accomodation (room, breakfast, lunch), the registration fee, the proceedings, refreshments, coffee and the conference dinner. The participation fee without accomodation will be 15.000 BF.

Contact address:
Prof. M.J. Goovaerts
K.U.Leuven
huis Eygen Heerd
CRIR
Minderbroederstraat 5
B-3000 Leuven, Belgium
tel/fax: (32) 16 29 53 46
email: fdbaa35@cc1.kuleuven.ac.be

CONFERENCE ON NUMERICAL MATHEMATICS

Date: 27–30 July, 1996.

Location: University of Cambridge, England.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:
A. Iserles
Dept. of Appl. Maths and Theor. Physics
Silver Street
Cambridge CB3 9EW , U.K.
email: ai@amtp.cam.ac.uk

INTERNATIONAL CONFERENCE ON NONLINEAR PROGRAMMING

Date: 2–5 September, 1996.

Location: Beijing, China.

Other information: CAM-Newsletter 11, nr. 2.

Contact address:
Prof. Ya-xiang Yuan
State Lab. of Scientific and Eng. Computing
ICMSEC, Chinese Academy of Sciences
P.O. Box 2719, Beijing 100080, China
Tel: +86-10-255-9001, +86-10-254-5820
Fax: +86-10-254-2285
email: yyx@lsec.cc.ac.cn

ECCOMAS 96
NUMERICAL METHODS IN ENGINEERING
COMPUTATIONAL FLUID DYNAMICS

Date: 9–13 September, 1996.

Location: Paris, France.

Other information: CAM-Newsletter 11, nr. 1.

Contact address:
ECCOMAS 96, Université de Paris VI
Laboratoire d'Analyse Numérique
4, Place Jussieu
75252 Paris Cedex 05, France
email: eccomas96@ann.jussieu.fr

IIPP-96
International Conference on
INVERSE and ILL-POSED PROBLEMS

Date: 9–14 September, 1996.

Location: Moscow, Russia.

Organizer: Moscow Lomonosov State University.

Topics:
- Inverse Problems for Differential Equations
- Inverse Problems in Natural Sciences, Engineering and Industry
- Mathematical Problems of Tomography
- Theory of Ill-Posed Problems
- Numerical Methods and Computational Algorithms for Ill-Posed Problems Solving.

Other information:
The Conference is dedicated to the memory of A.N.Tikhonov on the occasion of his 90th birthday.

Conference language: English and Russian.

Contact address:
Dr. A.S.Krylov
Faculty of Comput. Maths and Cybernetics
Moscow Lomonosov State University
Vorobievy Gory, 119899, Moscow, Russia
email: kryl@cs.msu.su

5th International Conference
MODELLING and SIMULATION of
ELECTRIC MACHINES, CONVERTERS and SYSTEMS

Data: 17–19 September, 1996.

Location: Saint-Nazaire, France.

Topics:
1. Electrical Engineering Components
2. Electrical Systems and Equipment
3. Methodological Aspects
   - specific numerical methods
   - graphical methods
   - ...
4. Model and Simulation Applications
5. Educational Aspects.

Contact address:
Secrétariat Electrimals 96
R. Le Doeuff GE 44 - Large Bd de l'Univ.
BP 406
44602 Saint-Nazaire Cedex, France
Tel: 40 17 26 02
Fax: 40 17 26 18
email: ledoeuff@large.crttsn.univ-nantes.fr

BEM 18
18th World Conference on
the BOUNDARY ELEMENT METHOD

Date: 24-26 September, 1996.

Location: Braga, Portugal.

Organizers:
Wessex Inst. of Technology, U.K.
Universidade do Minho, Portugal.

Sponsor:
International Society of Boundary Elements (ISBE).

Topics: BEM can now solve complex engineering problems and has been accepted as an alternative to other analysis techniques. The conference will deal with the following topics:
- Elastodynamics
- Fracture Mechanics & Fatigue
- Inelastic Problems
- Composite Materials

- Plates and Shells
- Contact Mechanics
- Geomechanics
- Material Processing and Metal Forming
- Soil Dynamics
- Electromagnetics
- Biomechanics
- Fundamental Principles
- Computational Techniques
- Refinement Methods & Adaptive Techniques
- Sensitivity Analysis
- Inverse Problems
- Applications in Optimisation
- Industrial Applications
- Heat Transfer
- Fluid Dynamics & Aerodynamics
- Compressible & Incompressible Flow
- Viscous Flow
- Non-Newtonian Flow
- Groundwater Flow
- Interfacial & Free Surface Flow
- Transport Problems
- Wave Propagation Problems
- Acoustics
- High Performance Computing
- Algorithms for Parallelization & Vectorization of BEM
- Massively Parallel Processing
- Expert Systems in BEM

Contact address:
Liz Kerr
Conference Secretariat, BEM 18
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA
Tel: 44 (0) 1703 293223
Fax: 44 (0) 1703 292853
email: CMI@ib.rl.ac.uk

2ND MATHMOD

Date: 5-7 February, 1997.

Location: Technical Un. Vienna, Austria.

Organizer:
Division for Mathematics of Control and Simulation (E114/5) at Technical Un. Vienna.

Topics:
All aspects of mathematical modelling of all types of systems will be considered.
Consequently, a wide variety of formal models will be discussed and the term "mathematical model" will include classical models such as differential or difference equations, Markov processes, ARMA models as well as more recent approaches such as Bond graphs or Petri nets. The topics to be discussed will include

- modelling theory
- processes and methods for model formulation, identification, development, reduction and validation etc. (incl. guidelines and check lists)
- automation of modelling and software aids for modelling
- modelling for/by simulation
- qualitative modelling including fuzzy and iterative appraoches to modelling
- modular modelling (especially applied to interdisciplinary fields such as mechatronic or controlled environmental systems)
- learning networks in modelling
- uncertainties in modelling
- methodologies for model validation
- fitting mathematical models to real processes
- the relationship between the modelling approach and problem solutions
- comparison of methods for modelling, model reduction and model validation
- effects of modelling errors on overall performance of an engineering system (e.g. relationship between modelling and control design)
- applications in the field of engineering systems and in natural sciences
- applications in other fields (such as environmental systems, biotechnology etc.)
- case studies allowing a comparison of ideas or methods
- education in modelling.

Contact address:
Univ. Prof. Dr. Inge Troch
Technische Universitaet Wien (E114/5)
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